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Competitiveness-Assessment-Based Monitoring of Socioeconomic Systems

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Analysis and evaluation of competitiveness of socioeconomic systems of different levels (regional, municipal, economic activity or industry, enterprise) are considered from methodological viewpoint. Methods of estimating competitiveness have been tested by the example of socioeconomic systems of Siberian Federal District. The approach developed can form the basis to reveal efficient lines of industrial policy to increase competitive capacity of the systems.

Keywords: socioeconomic system, competitiveness, integral assessment, method of principal components, status monitoring, efficient lines of industrial policy, competitive aspects and factors, macro- meso- and microlevel objects.

Introduction

Competitiveness is an integral efficiency characteristic of any socioeconomic system. Competitiveness is assessed in management to position the controlled system, to make decisions on development prospects, targets and methods to attain them and to develop system development policy lines.

The great number of methodological approaches to assessing competitiveness of countries, regions, industries and enterprises brings forth various assessments and ratings of the said systems. Divergent and contradictory ratings pose the information users a complicated problem: what assessments are to be used to make decisions and what ratings can be trusted. This, in its turn, proves the still existing need to develop alternative methods to assess the competitiveness. This is probably because

the methods used by different authors do not solve all problems facing researchers studying competitiveness.

Methods and Approaches

To define competitiveness each author uses his own individual approach. First studies of competitiveness were conducted exclusively within the context of spatial organization of industries and enterprises. Economically advantageous position was considered to be the pledge of its competitiveness (A. Losch, H. Hotelling, W. Launhardt, J. Thunen, A. Weber, E.M. Hoover, Ф. Giarratani–Hoover, 1999). Today this concept of competitiveness is not always applicable to socioeconomic systems. Original availability of the only competitive advantage, given territory does not guarantee its successful development. Past experience demonstrates that

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the systems not having this advantage can exhibit high level of competitiveness.

Nowadays theory offers both general definitions of competitiveness, and definitions concretized to the level of a subject of competitive relations. Most frequently researchers in their works define competitiveness as a totality of properties, characteristics of an object which provide its successful development with the emphasis on comparison with other analogous objects and necessity of special «properties» inherent to the system.

Concerning competitiveness it is customary to mention the works of M. Porter. His works on regional and international competition, competition between companies and on development of competitive strategies of different subjects formed the basis of fundamental assumptions of competitiveness and competitive advantages existing nowadays in all countries and scientific schools.

M. Porter identifies several competitiveness levels. The first competitiveness level is competitiveness in the field of products and services which is in the fact that firm produces products and services surpassing other products and services in fineness or cost¹. The next level is the enterprise level. According to M. Porter position of an enterprise in an industry is defined by competitive advantages: lower production costs and differentiation of goods². In his works M. Porter shows that competitiveness of a company is largely determined by the competitiveness of its economic environment depending on basic conditions and competition within the cluster.

According to M. Porter productivity is the only reasonable concept of competitiveness at the national level. It is through productivity that the main objective of any state – high and ever-growing living standards – is attained. On

the other hand, competitiveness of an individual country depends on its propensity to innovate and modernize. So, M. Porter states that development and implementation of innovations and production modernization process promote most efficient use of available labor resources and capital. These processes lead the country to attainment of high competitiveness level. According to M. Porter high competitiveness can be achieved not only by the subject originally possessing considerable resources, but also by the subject which can correctly, efficiently and reasonably organize its activities³.

Views of M. Best upon competitiveness differ. In his opinion the pledge of competitiveness is the method of organizing productive resources but not the intensity of their usage. In this manner of crucial importance is the capability to change-over for radically different methods of development, production, marketing of products, etc.⁴

The innovation aspect of competitiveness is found in the works of practically all modern researchers of this problem. E.g. L.K. Gurieva defines competitiveness of a region as an integral property of a region formed by a totality of qualitatively new factors and conditions. These factors are necessary for the region to move to the higher phases of socioeconomic and social-and-technological development. This definition underlines that competitiveness depends on «new factors and conditions». Thus, L.K. Gurieva places emphasis on the innovation development of regions⁵.

However, it is obvious that not only socioeconomic systems following the road of «innovation-based development» have high competitiveness (in any event, nowadays). Competitive are also systems developing owing to

¹ Porter, 2007.

² Porter, 2006.

³ Porter, 2006.

⁴ Best, 2002.

⁵ Gurieva, 2007.

the traditional factors: advantageous geographic position, availability of natural resources, large-scale industrial production, etc. It should be noted, that in the long term perspective these factors can deny further high development rate of the system. Along with this there are numerous examples of regions which do not stake at innovations and at the same time hold leading positions among other objects. From our viewpoint in this case it is possible to speak about high current competitiveness and low strategic one¹.

In line with the authors' standpoint call competitiveness, provided for by the so-called traditional factors, «current competitiveness». Call competitiveness formed by the effect of «new factors» (implementation of innovations, development of education, use of information technologies, etc.) «strategic competitiveness», i.e. competitiveness, providing for long-term development.

Thus, plurality of approaches to the concept of «competitiveness» prohibit speaking about agreement of opinions among authors on competitiveness of country, region, industry, enterprise is. Some authors lay emphasis on indices by which competitiveness can be estimated (A.N. Prazdnichnykh, N.I. Pavlovsky et al.), other authors pinpoint index dynamics and necessity of comparing with other analogous objects (M.M. Plyashko, D.Ye. Sorokin et al.), the third involve in the definition factors of competitiveness of an object of a certain level (L.K. Gurieva, L.S. Shekhovtseva et al.).

Concerning the factors of competitiveness approaches described in theoretical studies by different authors also vary. In this field the studies by A.G. Granberg deserve special attention. For main components of successful advance of

socioeconomic systems to competitiveness he identifies the following factors: human, technical-technological, natural resources, institutional, organizational, informational².

A.I. Gavrilov does not separate the factors of socioeconomic development of a region from the factors of competitiveness. Among the socioeconomic factors of regional development he classes production, competitive and market factors. The competitiveness factors he subdivides into factors of direct effect (natural resources, human resources, external relations, etc.) and indirect effect (general economic, general political, etc.)³.

Fascinating approaches to define the competitiveness factors are presented by N.Ya Kalyuzhnova and Yu.K. Persky. They suggest to take the principle of rarity (scarcity) of natural resources as the basis for marking out the principal factors of competitiveness. This involves consideration of resource, investment, innovation and information factors. Effect of each group of factors brings forth certain competitive advantages. N.Ya Kalyuzhnova considers competitive interaction of regions during knowledge-based economy development⁴.

Factors of competitiveness of socioeconomic systems are essentially aspects of competitiveness, which should be assessed to yield adequate results from comparison of these systems. Main methodological approaches to assessment of competitiveness can be united into three groups: based on statistical indices, ranking and expert estimates. Each methodological approach can involve simultaneous use of several methods and devices applied to different indices at a certain estimate level. In actual practice this is realized by the following procedures: monitoring of main

¹ In addition to isolating levels of management objects many authors of works on competitiveness isolate several levels of competitiveness, too: relative and absolute competitiveness; general, economic and strategic; current and strategic competitiveness.

² Granberg, 2004.

³ Gavrilov, 2002.

⁴ Competitiveness of Regions, 2003.

macroeconomic indices, their comparison with threshold values and indicative analysis; methods of expert estimate to rank the systems by the level of development; relative rate data on basic macroeconomic indicators and their dynamics, etc.

It should be noted that all methods used are to a certain extent restricted in terms of their application. Some methods are fully based on subjective data of expert estimates. This makes them irreproducible for other researchers and puts in doubt the adequacy of results produced. Some approaches are specified by the lack of mechanism to calculate the weighing coefficients used to aggregate the indices into multiple indicators. Methods are frequently constructed as applied to a certain object possessing its own specifics. These methods cannot be applied to other objects or have to be substantially modified up to reconstruction of calculation algorithm. In addition, each researcher lays emphasis on a certain aspect of competitiveness. This, respectively, reflects in the selection of factors with highest specific weight in the system of indicators.

Developed and used today are numerous techniques of evaluating specific weights of indices to construct integral indicators. However, these techniques are not widely used in the approaches of researchers studying the problem of competitiveness, probably because of their labor intensity and sophisticated nature. S.A. Aivazyan, V.M. Buchshtamber, I.S. Yenyukov, L.D. Meshalkin, V.V. Shakin, V.V. Strizhov and other researchers worked in this field.

E.g., S.A. Aivazyan has developed the «expert-statistical method». Within the framework of this method evaluated is to be specific weight of effect of partial indices on the total aggregated status of efficiency. After that, according to this method an integral indicator is to be constructed in the form of a linear combination of objects'

indicators. S.A. Aivazyan also proposed the following methods of constructing the integral indicator: method of principal components, factor analysis, method of extremal grouping, multidimensional scaling and selection of most informative indices¹.

Methods of Assessing Competitiveness

To eliminate the above mentioned constraints of the methods developed the authors suggest the following approaches:

- system approach (consider objects as socioeconomic systems and develop a system of indicators to assess level of competitiveness);
- structural approach (consider individual components forming the general result; consider a socioeconomic system a complex structure including systems of other levels);
- integration approach (aggregate individual specific indicators into integral indicators; study interactions to create aggregated groups);
- comprehensive approach (take into account various aspects of competitiveness in aggregated groups);
- dynamic approach (retrospective and perspective analysis, analysis of indicators' dynamics);
- process approach (consider the formation of competitive advantage as a complex dynamic process depending on initial prerequisites and efficiency of managing this process);
- optimization approach (transition from qualitative characteristics to quantitative indicators normalizing the indicators, reducing them to commensurable form convenient for further analysis);

¹ Aivazyan, 1998.

- situation approach (each indicator is analyzed from the viewpoint of its significance to form the final result, study variability (variableness) of indicators, weigh the indicators).

All these approaches used in a system made possible to develop procedures possessing a clear-cut structure, application algorithm. The procedure proposed overcomes many of the said constraints and shortcomings leading to incommensurable and inadequate results. The authors have developed an approach based on calculation of normalized indicators and aggregating them into indicators with application of weight coefficients. The said indicators are different components of competitiveness of the objects.

Initial statistical information are socioeconomic indicators and system development efficiency indicators available in public data sources. The indicators initially formed into an array are combined into component-blocks of competitiveness. The produced sampling of indices undergoes normalization. The normalized indicators are ranks (from 0 to 10) to form the basis to judge the position of the objects analyzed in the general rating of systems and about the «step size» between the objects in the rating.

As mentioned earlier, the normalized indicators are aggregated with use of the weight coefficients. For the method of finding the weight coefficients we suggest to use the principal component procedure which makes possible to select statistically the indicators at the same time. Transition from a large number of initial indicators of the object analyzed to substantially smaller amount of most informative variables is necessary due to several reasons. First, this is duplication of information transmitted by highly interrelated indicators. Second, the «non-informativeness» of the indicators slightly varying from one object to another. Third, the feasibility of aggregating, i.e.

weighed summation of indicators with the weight coefficients defined on the basis of principal component method.

The system of indicator-components of general level of competitiveness is a multilevel system. At the «top» level distinguished are two aspects of competitiveness: current and strategic. Each of them is an aggregated indicator combining aspects of competitiveness of the following levels. Among these aspects are: production potential, financial component, social aspect, level of development of innovations and technologies, etc. Each of these aspects is assessed on the basis of system of indicators using the weight coefficients. The indicators produced are aggregated into the indicators of the next level by weighing. Developed for each level of the socioeconomic system is its hierarchy of competitiveness indicators taking into account specifics of the object.

The system of indicators proposed also serves the purpose of monitoring the status of socioeconomic systems through indicators of their activities. Realization of the entire system competitiveness evaluation algorithm forms the basis to analyze the competitiveness indicators in dynamics, to make conclusions about the processes running in system development and to show the interrelations between different management levels. This analysis makes possible to find problem aspects of competitiveness of systems and their advantages as compared to other systems. To reveal advantages and shortcomings is necessary to mould an adequate policy at the respective level of the socioeconomic system. This policy serves the purpose of eliminating development constraints to create new and maintain existing competitive advantages.

Appraisal

The approach put forward was tested by the authors by example of socioeconomic objects of

Siberian Federal District: regional and industrial socioeconomic systems and municipal formations and enterprises. The level of competitiveness of objects was assessed including identification of current and strategic aspects, systems were rated by their competitiveness level, «problem» aspects of their development have been found. Analysis of competitiveness and socioeconomic indicators over several years formed the basis to demonstrate major lines of policy oriented to eliminate negative trends in dynamics of competitiveness level of socioeconomic systems¹.

To investigate competitiveness of socioeconomic systems the authors suggest the following analysis logics: evaluate competitiveness of macrosystems (regional socioeconomic systems), analyze competitiveness of mesolevel systems (industrial socioeconomic systems and territories – municipal formations) and then – study competitiveness of economic entity of microlevel (enterprises operating within the limits of competitive objects of mesolevel). This sequence of analysis of indicators and indices of competitiveness makes possible to trace which manufacturing capacities provide the regional macrosystem with competitive advantages. In addition, it makes possible to find out the enterprises which form the basis of competitiveness of the territories and industries (economic activities) and, accordingly, of the entire regional economy.

It is expedient to analyze competitiveness indicators in dynamics, and consider variation of individual components as reasons of general dynamics of the indicator. These aims can be attained by economic analysis methods and methods of mathematical statistics.

The procedure to assess competitiveness level was appraised by economic analysis techniques. As the indicators are additive models, the effect of

factors on indicators can be qualitatively evaluated by chain substitution method and proportional division technique (shared participation). These methods are the deterministic analysis methods with initially known types of models analyzed.

It should be noted that each level of the object under study requires development of a system of indicators allowing to assess adequately the level of individual competitiveness components. Thus, to use the proposed approach requires taking into account specifics of the selected object to expand the available base of statistical information to perform the estimate.

Conclusions

The procedure developed by the authors overcomes the earlier found shortcomings and constraints of the existing methodological approaches. It exhibits the following distinctive features:

- maximum representativeness of indicators used to assess competitiveness of industrial and regional socioeconomic systems, and enterprises (it is recommended to use indicators from official sources of statistical information and financial accounting of the enterprises);
- adaptation of indices and indicators used to the opportunities of the existing public statistical accounting;
- comprehensiveness of the estimate providing for taking into account all most important components of competitiveness of the systems;
- systematization of the estimate implying consideration of interconnections between the indicators used and between the levels of objects of management (socioeconomic systems);
- use of weight coefficients attaching different value to the indices when they are aggregated into indicators;

¹ Zander et al., 2006, 2007, 2009.

- feasibility of building up the procedure of estimating the competitiveness level of systems by adding competitiveness factors and aspects without reconstructing the entire calculation algorithm;
- consistency of the system of indicators and indices with the objective of monitoring and forecasting the economic and social development of systems with different management levels.

So, the procedure proposed is a comprehensive approach to estimating the competitiveness of socioeconomic systems of micro-, meso- and macrolevel.

Nowadays competitiveness is the main index of efficiency of policy pursued at the respective management level. Competitive advantages of a socioeconomic system it initially possessed in the form of natural and labor resources, advantageous geographic position, etc. is not

a guarantee of successful development. The initially available potential may be not used or lost. Socioeconomic development of a territory is based on efficiency of the real sector, whose successful functioning is provided for by the measures of industrial policy. This raises the question of the need to mould an adequate industrial policy at the regional level and structural policy to manage development of industries and enterprises.

Efficiency of state influence on economy depends on timely monitoring of processes running within the socioeconomic system. This requires systematic complex analysis of socioeconomic indices, and competitive advantages of the system. This is necessary to find out negative trends in object development, their timely elimination and create incentives for positive changes in competitiveness of industrial and regional socioeconomic systems.

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Мониторинг состояния социально-экономических систем на основе оценки конкурентоспособности

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Рассматриваются методологические вопросы анализа и оценки уровня конкурентоспособности социально-экономических систем разного уровня (регионов, муниципальных образований, видов экономической деятельности или отраслей, предприятий). Предложенная авторами методика оценки уровня конкурентоспособности апробирована на примере социально-экономических систем Сибирского федерального округа. Разработанный подход может служить основой для выявления эффективных направлений промышленной политики в целях повышения конкурентоспособности систем.

Ключевые слова: социально-экономическая система, конкурентоспособность, комплексная оценка, метод главных компонент, мониторинг состояния, эффективные направления промышленной политики, аспекты и факторы конкурентоспособности, объекты макро-, мезо- и микроуровня.
